



MONTGOMERY WATSON

January 30, 2001

Timothy J. Prendiville
Remedial Project Manager
United States Environmental Protection Agency, Region 5
Mail Code SR-J6
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Delineation of Suitable Vegetative Soil Cover Technical Memorandum
Blackwell Forest Preserve Landfill Site

Dear Mr. Prendiville:

On behalf of the Forest Preserve District of DuPage County, we are pleased to submit the Delineation of Suitable Vegetative Soil Cover Technical Memorandum for the Blackwell Forest Preserve Landfill Site.

If you have questions on the attached report, please contact me at (630) 836-8900.

Sincerely,

MONTGOMERY WATSON

Lonny R. Boiling (FOR)

Walter G. Buettner, P.E.
Supervising Engineer

cc: Rick Lanham – Illinois Environmental Protection Agency (2 copies)
Jerry Hartwig – Forest Preserve District of DuPage County
David Barritt – Chapman and Cutler (without attachment)

Attachment

LRB/kkc
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2090045.071802

EPA Region 5 Records Ctr.



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**DELINEATION OF SUITABLE VEGETATIVE SOIL COVER
TECHNICAL MEMORANDUM**

**BLACKWELL FOREST PRESERVE LANDFILL SITE
DUPAGE COUNTY, ILLINOIS**

Montgomery Watson File No.: 2090045

Prepared For:

**Forest Preserve District of
DuPage County, Illinois**

Prepared By:

**Montgomery Watson
27755 Diehl Road, Suite 300
Warrenville, Illinois 60555**

January 2001



MONTGOMERY WATSON

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TECHNICAL MEMORANDUM**

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Prepared For:

**Forest Preserve District of
DuPage County, Illinois**

Prepared by: Lonny R. Boring
Lonny R. Boring
Associate Engineer

01-30-01
Date

Approved by: Lonny R. Boring (FOR)
Walter G. Buettner, P.E.
Project Manager

01-30-01
Date

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order by Consent
FPD	Forest Preserve District of DuPage County
HRS	Hazard Ranking System
LCS	Leachate Collection System
LFG	Landfill Gas
MSL	Mean Sea Level
NPL	National Priorities List
PLS	Professional Land Surveyor
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Site	Blackwell Landfill
U.S. EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This technical memorandum has been prepared by Montgomery Watson on behalf of the Forest Preserve District of DuPage County (FPD), Illinois, and presents a summary of the delineation of suitable vegetative soil cover at the Blackwell Landfill (Site) in DuPage County, Illinois. The purpose of the delineation activities was to define areas on the landfill that contained a minimum of 24 inches of vegetative soil cover above the compacted clay cap.

These delineation activities were conducted as part of the overall revegetation and restoration strategy for the Site that will convert the existing vegetation on the landfill to an Illinois native prairie landscape. The existing Eurasian grasses will be converted to native grasses and forbs, and native trees and shrubs will be planted within the areas of suitable vegetative soil cover. The overall revegetation strategy for the Blackwell Landfill is outlined in two previous standalone reports entitled Final Arboreal Study Report (Montgomery Watson, July 2000), and Revised Phase I Restoration Plan for the Revegetation of the Blackwell Landfill (Montgomery Watson, December 2000).

The FPD may augment this study in the future by delineating other areas of suitable vegetative soil cover or by placing additional vegetative soil to create new areas of suitable vegetative soil cover. The results of any additional delineation or augmentation activities will be submitted to the United States Environmental Protection Agency (U.S. EPA).

Aug. must be approved by EPA
First

1.1 BACKGROUND

The Site is located within the Blackwell Forest Preserve approximately six miles southwest of downtown Wheaton, Illinois in Section 26, Township 39 North, Range 9 East, DuPage County, Illinois (Figure 1). The Blackwell Forest Preserve encompasses 1,200 acres of woodlands, grasslands, wetlands and lakes, with the landfill covering approximately 40 acres in the central part of the preserve (Figure 2).

1.1.1 Landfill Construction

The Blackwell Landfill is located adjacent to an abandoned gravel pit that was purchased by the FPD in 1960. The land was purchased with the intent to create a large hill that could be used by the public for recreational purposes. The FPD began construction of the landfill in 1965, and accepted the final load of refuse in 1973. By the time final contouring and landscaping was completed in 1975, 40 to 60 feet of clay had been placed on top of refuse on the southwest side of the landfill to create Mount Hoy. Mount Hoy was finished at an elevation of 839 feet above mean sea level (MSL), approximately 150 feet above the surrounding natural topography. Other areas of the landfill were covered with two to 15 feet of predominantly clay cover. In some areas, a vegetative soil cover of varying sand, gravel and clay composition was placed. A final layer of clayey topsoil (minimum of four to six inches thick) was installed and vegetated.

The Blackwell Landfill contains approximately 1.5 million cubic yards of refuse classified as general household refuse and light industrial waste. The construction of the hill also includes an equal volume of natural soil fill.

1.1.2 Post-Construction History

In March 1986, the U.S. EPA evaluated the site using the Hazard Ranking System (HRS). A composite score of 35.57 (above the 28.5 threshold for National Priorities List (NPL) listing) was assigned, with the following scores assigned to each potential route: Surface Water 0.0; Air 0.0; and Groundwater 61.54. The site was proposed for inclusion on the NPL in the Federal Register, Volume 53, Number 122, dated June 24, 1988. The Site received final listing on the NPL in the Federal Register, Volume 55, Number 35, dated February 21, 1990. Subsequent to the final listing on the NPL, a Remedial Investigation/Feasibility Study (RI/FS) was performed at the landfill.

On March 1, 1996, the U.S. EPA and the FPD agreed to an Administrative Order by Consent (AOC), Docket No. V-W-'96-C-341, which specified response actions that the FPD would conduct at the Site. These response actions have been completed, or are part of ongoing operations and maintenance (O&M). They include:

- Delineation of the limits of waste at the landfill edges;
- Cap characterization to delineate areas which did not have two feet of low permeability soil over refuse;
- Repair of those portions of the landfill cover that had less than two feet of low permeability soil over refuse;
- Regrading to promote surface water drainage off the landfill;
- Installation of a leachate collection system (LCS);
- Installation of a passive landfill gas (LFG) venting system;
- Treatment of landfill leachate¹; and
- Monitoring of groundwater and system performance.

On September 30, 1998, the U.S. EPA issued the Record of Decision (ROD) for the Blackwell Landfill. The ROD requires long term O&M of the previously completed response actions, long-term monitoring, monitored natural attenuation of groundwater, and possible augmentation of the LCS and LFG venting system. In 2000, the FPD augmented the LFG venting system in order to consolidate all LFG emissions into one passive gas vent located at the top of Mount Hoy.

¹ Leachate is collected in a holding tank and is transported to the Wheaton Sanitary District Waste Water Treatment Plant for disposal.

On April 9, 1999, the U.S. EPA issued a Unilateral Administrative Order, Docket No. V-W-'99-C-541, to the FPD. This Unilateral Administrative Order directed the FPD to perform the selected remedial action described in the ROD, and set forth the requirements for implementation of the remedial action.

1.2 REPORT PRESENTATION

The report is presented in the following four sections:

- This Section 1 presents the purpose of the delineation activities and describes the current conditions at the Blackwell Landfill;
- Section 2 summarizes the delineation activities conducted at the Site;
- Section 3 provides investigation conclusions; and
- Section 4 provides report references utilized in this technical memorandum.

2.0 SOIL DELINEATION ACTIVITIES

The distribution and thickness of the vegetative soil cover over the compacted clay cap on the Blackwell Landfill was mapped in the Final Arboreal Study Report using soil boring data compiled during previous investigations². The data indicated that the thickness of vegetative soil cover on parts of the Blackwell Landfill vary from less than six inches (i.e., topsoil) to greater than twelve feet. The areas of suitable vegetative soil cover were defined as those areas having a minimum of 24 inches of uncompacted sandy or silty soils above the underlying compacted clay cap.

The Final Arboreal Study Report defined four areas (i.e., Areas 1 through 4) on the landfill that have vegetative soil cover greater than two foot thickness above the top of the clay cap. However, the report also recommended further investigative activities to accurately define the boundaries of the identified areas, and to define the thickness of vegetative soil cover where appropriate information was not available.

Two of the four areas identified during the Final Arboreal Study Report and three additional areas identified by the FPD were delineated during the study. The two areas identified in the Final Arboreal Study Report that were not delineated are located atop Mt. Hoy, the landfill highpoint, and on the east side of the landfill near extraction well EW-8. The FPD has decided not to delineate the vegetative soil cover around Mt. Hoy because trees are not intended to be planted around Mt. Hoy. Instead, Mt. Hoy is intended to remain as an unrestricted scenic overlook area. The second area not currently delineated is located south of EW-8 adjacent to a poorly graded area which has developed due to landfill settlement. As reported in the December 12, 2000 Revised Second Year Report on the Leachate Collection and Landfill Gas Extraction Systems, this area is currently being filled by the FPD with low permeability soil and topsoil to improve surface drainage. Thus, delineation activities were not undertaken for this technical memorandum since the results would not reflect current topographic conditions.

The soil delineation activities were conducted on August 31 and September 1, 11, and 12, 2000. Five general areas on the landfill were delineated using test trenching and topographic surveying techniques. Three areas were delineated with test trenching on August 31 and September 1, 2000 (Figure 3) and include:

- The Middle Area (i.e., Area 2 from the Final Arboreal Study Report);
- The Toboggan Hill Area (i.e., Area 1 from the Final Arboreal Study Report); and
- The North Area.

² Blackwell Forest Preserve Deep Vents and Exploratory Borings (Testing Service Corporation, 1986); Technical Memorandum Predesign Investigation (Montgomery Watson, 1997); and Revised Predesign Report (Montgomery Watson, 1997).

Two areas were delineated with topographic surveying conducted on September 11 and 12, 2000 (Figure 3) and include:

- Cap Repair Area 2 (Final Construction Completion Report, Montgomery Watson, April 1999); and
- Cap Repair Area 4 (Final Construction Completion Report).

Details are provided in subsequent sections of this technical memorandum.

2.1 TEST TRENCHING

Test trenching was conducted on August 31 and September 1, 2000 using a small backhoe. A total of 23 test trenches designated 1 through 23 (Figure 3) were excavated to depths typically between 24 and 36 inches in the three general areas of the landfill described above; the Middle Area, the Toboggan Hill Area, and the North Area. However, two of the trenches (i.e., 10, and 11) that were excavated in areas west-southwest of LCS extraction wells EW-1 and EW-1A, were subsequently determined by land surveying to be located outside of the limits of refuse.

Following the excavation of the test trenches, a Montgomery Watson geologist logged the soil materials present within each of the trenches based on visual identification. Photographs of the trenches and trench cross-sections are provided in Appendix A. The thickness of the vegetative soil cover at the test trench locations are summarized in Table 1.

The soils logged within the test trenches were deemed suitable vegetative soil cover if a minimum of 24 inches of uncompacted sandy or silty soils were present above the top of the compacted clay cap. Organic clay soils were also deemed suitable for vegetative soil cover as long as they were uncompacted, and were greater than 24 inches in thickness above the top of the compacted clay materials of the landfill cap.

The compacted clay cap of the landfill was encountered but was not breached during the test trenching activities. Following inspection and material description, the test trenches were backfilled. The excavated soils were backfilled to the extent possible in the reverse order they were excavated (i.e., the first soil removed was the last placed back into the excavations). The backfilled soils were compacted with the backhoe bucket, and an Illinois Professional Land Surveyor (PLS) then surveyed the location of each test trench.

Suitable vegetative soil cover delineation activities were also conducted in conjunction with the LFG Augmentation construction activities that occurred during August and September 2000. Trenches excavated during LFG augmentation in the Middle Area and the North Area were inspected for suitable vegetative soil cover, and locations adjacent to delineated areas with 24 or more inches of uncompacted sandy or silty soils over the top of clay cap were integrated into the test trenching survey (Figure 3).

2.2 TOPOGRAPHIC SURVEYING

Topographic surveying was conducted on September 11 and 12, 2000 to delineate the distribution and thickness of the suitable vegetative soil cover in Cap Repair Area 2 and Cap Repair Area 4 (Figure 3). Cap repairs were conducted in 1997 and 1998 as required by the AOC. Following cap repair completion, an Illinois PLS completed a topographic survey of the top of compacted clay cap as part of the quality control and design adherence testing. These final surveyed coordinates and elevations of the top of clay cap were reported in the Construction Completion Report.

Following final placement, compaction, and surveying of the Cap Repairs in Area 2 and Area 4, the FPD placed additional clay material on top of the completed clay cap to enhance drainage. By relocating the top of clay cap survey locations and resurveying the existing ground surface elevation, the depth of soil cover over the top of clay cap was determined by subtracting the top of clay cap elevation from the current ground surface elevation. No corrections were made to the calculated thickness of suitable vegetative soil cover for possible landfill settlement. Those areas with equal to or greater than 24 inches of uncompacted soil over the top of clay cap were deemed suitable as vegetative soil cover. The thickness of the vegetative soil cover within Cap Repair Area 2 and Cap Repair Area 4 are summarized in Table 1.

3.0 CONCLUSIONS

3.1 TEST TRENCHING

Twenty trenches were excavated within the Middle Area, the Toboggan Hill Area, and the North Area on August 31 and September 1, 2000. For convenience, each of these areas will be discussed individually.

Middle Area

Seven test trenches (i.e., 1 through 6, 13) were excavated in the Middle Area. In addition, three excavation locations associated with the LFG Augmentation (i.e., 1001, 1003, 1005) were inspected for suitable vegetative soil cover (Figure 3).

The thickness of suitable vegetative soil cover in the Middle Area varies from six inches to 40 inches (Table 1). Six of the ten locations inspected had suitable vegetative soil cover (Table 1, Appendix A). These adjacent locations of suitable vegetative soil cover are delineated in Figure 4.

Toboggan Hill Area

Four test trenches (i.e., 9, 14 through 16) were excavated in the Toboggan Hill Area. In addition, three excavation locations associated with the LFG Augmentation (i.e., 47, 49, and 50) were inspected for suitable vegetative soil cover (Figure 3).

The thickness of suitable vegetative soil cover in the Toboggan Hill Area varies from two inches to 34 inches (Table 1). Six of the seven locations inspected had suitable vegetative soil cover (Table 1, Appendix A). These adjacent locations of suitable vegetative soil cover are delineated in Figure 4.

North Area

Nine test trenches (i.e., 7, 8, 17 through 23) were excavated in the North Area. In addition, two excavation locations associated with the LFG Augmentation (i.e., 3, 5) were inspected for suitable vegetative soil cover (Figure 3).

The thickness of suitable vegetative soil cover in the North Area varies from 20 inches to 38 inches (Table 1). Ten of the eleven locations inspected had suitable vegetative soil cover (Table 1, Appendix A). These adjacent suitable locations of vegetative soil cover are delineated in Figure 4.

3.2 TOPOGRAPHIC SURVEYING

Two areas (i.e., Cap Repair Area 2 and Cap Repair Area 4) were investigated by resurveying the current topographic elevations in locations where the elevation of the top of

clay cap was previously recorded. For convenience, these areas will be discussed individually.

Cap Repair Area 2

Eight locations were resurveyed by a PLS in Cap Repair Area 2 (Figure 3). The thickness of vegetative soil cover varies from 4 inches to 41 inches in Cap Repair Area 2 (Table 1).

Six adjacent locations (i.e., 806, 809, 858, 934, 941, and 945) have suitable vegetative soil cover. These locations are delineated in Figure 4.

Cap Repair Area 4

Eighteen locations were resurveyed by a PLS in Cap Repair Area 4 (Figure 3). In addition, test trench 12 was excavated in Cap Repair Area 4. The thickness of vegetative soil cover varies from 7 inches to 29 inches in Cap Repair Area 4 (Table 1).

Five of 19 locations have suitable vegetative soil cover; however, the locations with greater than 24 inches of vegetative soil cover were not adjacent (i.e., 12, 108, 127, 130, and test trench 12; Figure 3). Therefore no contiguous area of suitable vegetative soil cover exists in Cap Repair Area 4 unless the FPD places additional soil in the area.

4.0 REFERENCES

Montgomery Watson, 1997. Technical Memorandum Predesign Investigation, January 1997.

Montgomery Watson, 1997. Revised Predesign Report, July 1997.

Montgomery Watson, 1999. Final Construction Completion Report, April 1999.

Montgomery Watson, 2000. Final Arboreal Study Report, July 2000.

Montgomery Watson, 2000. Revised Revised Second Year Report on the Leachate Collection and Landfill Gas Extraction Systems, December 2000.

Montgomery Watson, 2000. Revised Phase I Restoration Plan for the Revegetation of Blackwell Landfill, December 2000.

Testing Service Corporation, 1986. Blackwell Forest Preserve Deep Vents and Exploratory Borings, 1986.

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Table 1
Thickness of Vegetative Soil Cover
Blackwell Landfill, DuPage County, Illinois

TEST TRENCHING/EXCAVATIONS		
Area	Trench Number	Thickness of Cover (in.)
Middle Area	1	24
	2	30
	3	12
	4	6
	5	12
	6	12
	13	26
	1001 ⁽²⁾	40
	1003 ⁽²⁾	40
	1005 ⁽²⁾	40
Toboggan Hill Area	9	2
	14	24
	15	29
	16	34
	47 ⁽²⁾	32
	49 ⁽²⁾	32
	50 ⁽²⁾	32
North Area	7	30
	8	2
	17	25
	18	24
	19	38
	20	28
	21	24
	22	28
	23	26
	3 ⁽²⁾	30
	5 ⁽²⁾	30

TOPOGRAPHIC SURVEYING		
Area	Survey Location ⁽¹⁾	Thickness of Cover (in.)
Cap Repair Area 2	806	31
	809	26
	812	4
	843	18
	858	24
	934	41
	941	34
	945	34
Cap Repair Area 4	12	26
	12 ⁽³⁾	24
	32	16
	34	16
	36	12
	40	13
	42	19
	49	15
	56	20
	91	19
	102	13
	104	12
	105	11
	106	7
	108	26
	112	10
	127	25
	130	29

NOTES:

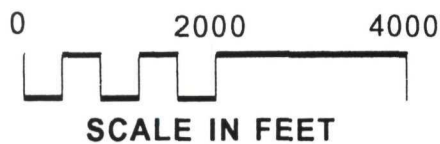
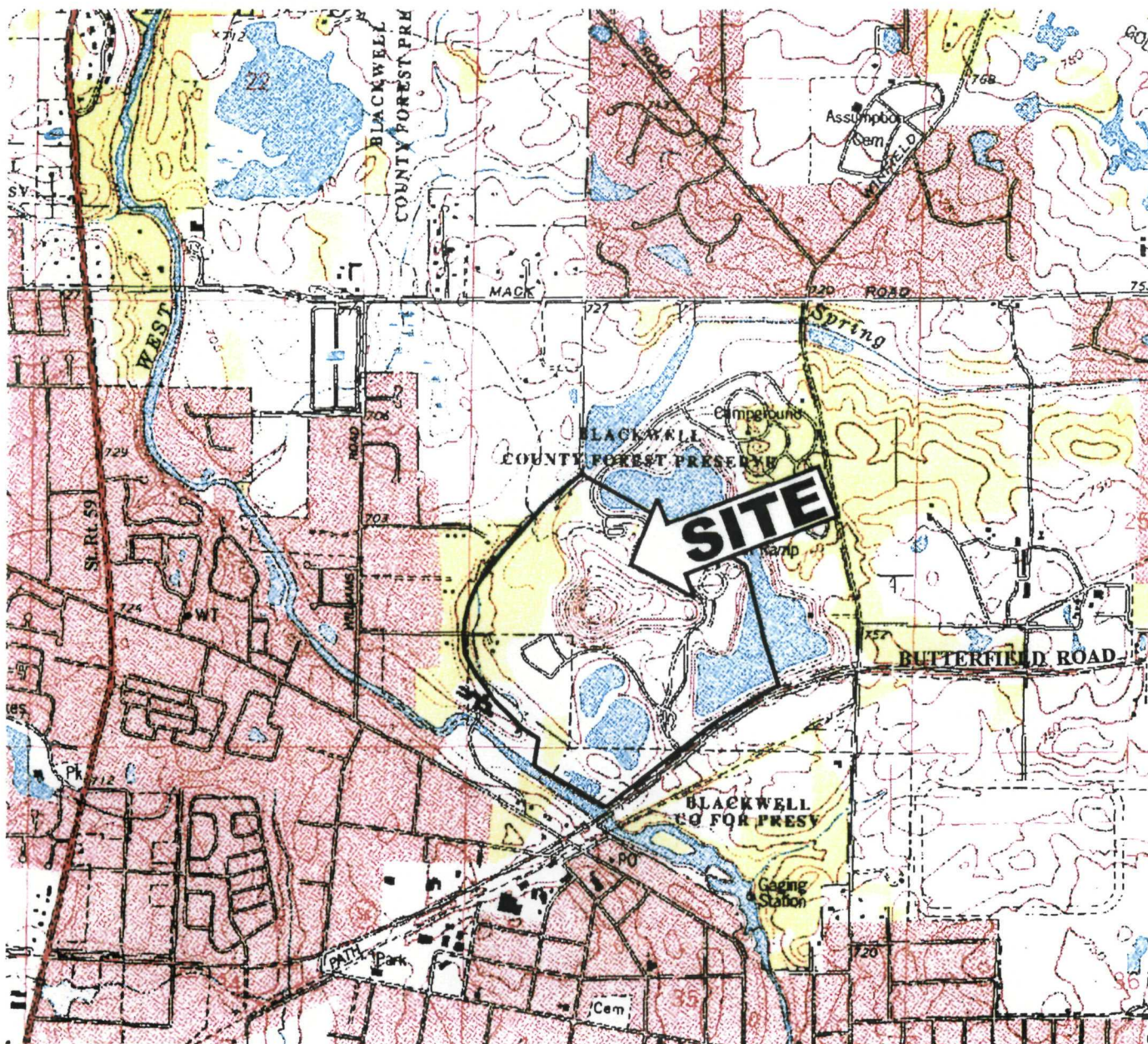
Bold: Indicates Suitable Vegetative Cover.

(1) Reported in the Construction Completion Report (Montgomery Watson, 1999).

(2) Location Documented during LCS and LFG Augmentation, 2000.

(3) Trench Location excavated in Cap Repair Area 4.





Base map developed from the
Naperville, Illinois 7.5 Minute
U.S.G.S. Topographic Quadrangle Map
Dated 1993



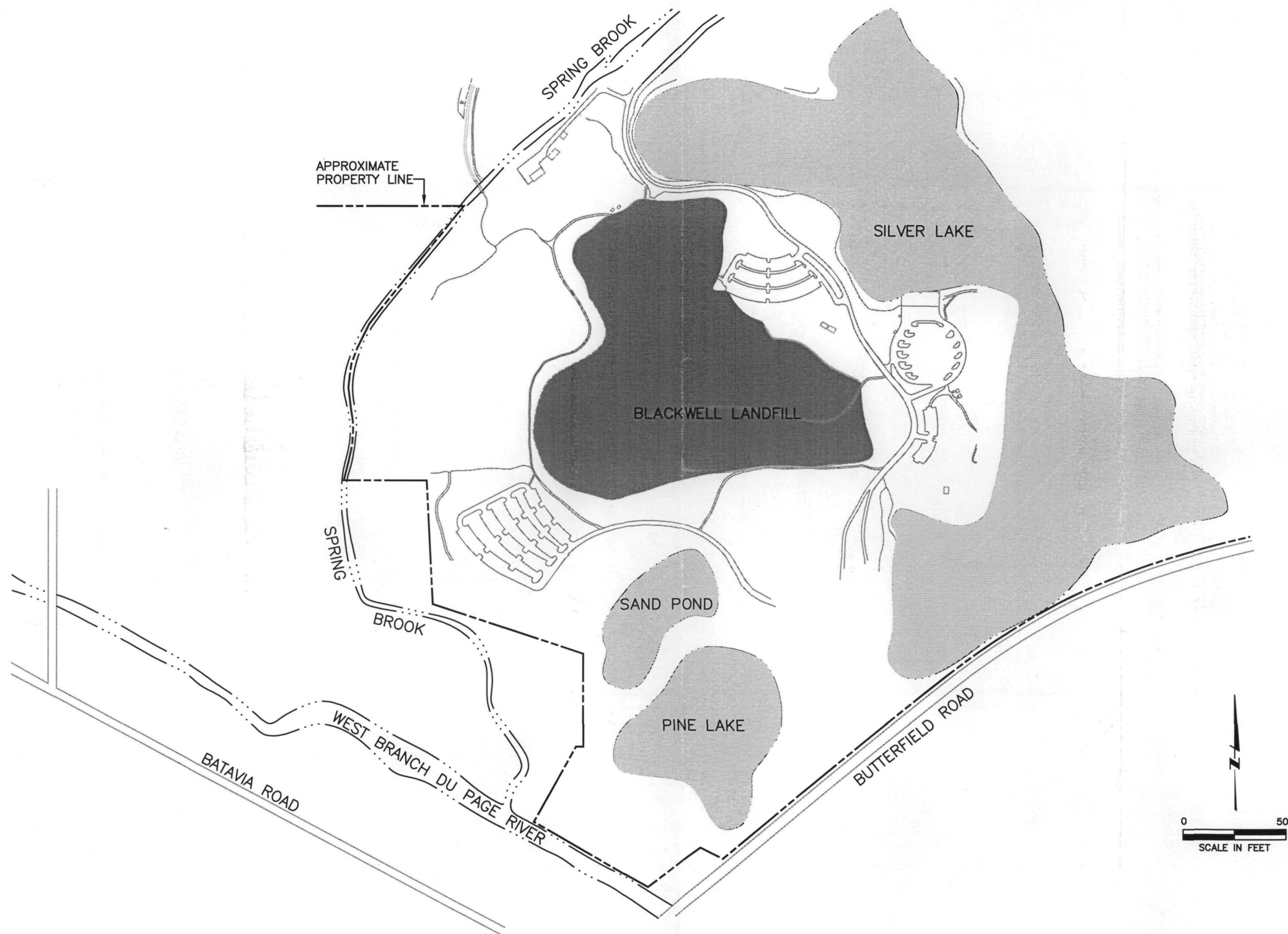
MONTGOMERY WATSON
Chicago, Illinois

**BLACKWELL LANDFILL
DUPAGE COUNTY, ILLINOIS**

SITE LOCATION

FIGURE

1



Plot Date: 01-22-2001 3:31pm

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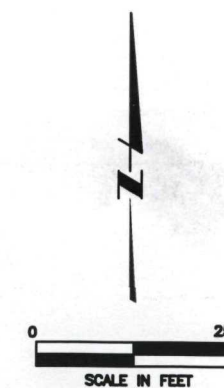


LEGEND

- MH-6 MANHOLE LOCATION AND NUMBER WITH LIQUID CUTOFF TRENCH AND PIPE
- EW01 LEACHATE EXTRACTION WELL/GAS VENT LOCATION AND NUMBER
- APPROXIMATE LIMITS OF REFUSE BASED ON GEOPHYSICAL TESTING AND SOIL BORINGS
- LS1 LIFT STATION LOCATION AND NUMBER
- LEACHATE PRESSURE CONVEYANCE PIPE
- LEACHATE GRAVITY CONVEYANCE PIPE
- GAS HEADER PIPE
- DL01 DRIPLEG LOCATION AND NUMBER
- VEGETATIVE COVER TEST METHOD
- DELINEATED DURING LFG AUGMENTATION TEST TRENCH
- DELINEATED WITH TOPOGRAPHIC SURVEY
- EXTENT OF AREA OF INVESTIGATION

NOTES

1. APPROXIMATE LIMITS OF REFUSE HAVE BEEN ESTIMATED BASED ON INFORMATION PRESENTED IN THE PREDESIGN REPORT, APRIL 1997.



SCALE
AS SHOWN

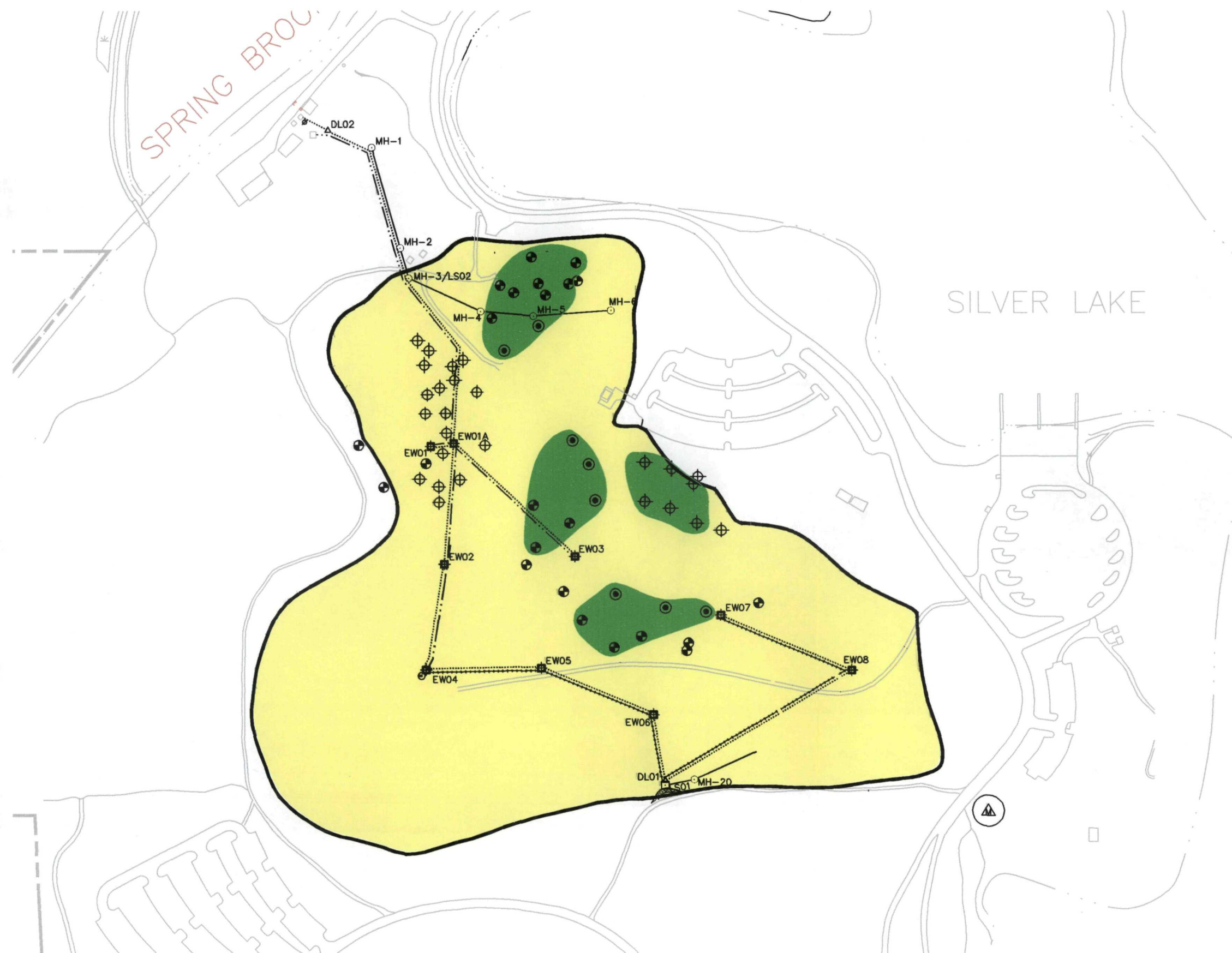


MONTGOMERY WATSON
Chicago, Illinois

BLACKWELL LANDFILL NPL SITE
DU PAGE COUNTY, ILLINOIS

VEGETATIVE SOIL COVER
PROGRAM
AREAS OF INVESTIGATION

APPENDIX
3



LEGEND

- MH-6 MANHOLE LOCATION AND NUMBER WITH LIQUID CUTOFF TRENCH AND PIPE
- EW01 LEACHATE EXTRACTION WELL/GAS VENT LOCATION AND NUMBER
- APPROXIMATE LIMITS OF REFUSE BASED ON GEOPHYSICAL TESTING AND SOIL BORINGS
- LS1 LIFT STATION LOCATION AND NUMBER
- LEACHATE PRESSURE CONVEYANCE PIPE
- LEACHATE GRAVITY CONVEYANCE PIPE
- GAS HEADER PIPE
- DL01 DRIPLEG LOCATION AND NUMBER

VEGETATIVE COVER TEST METHOD

- DELINEATED DURING LFG AUGMENTATION
- TEST TRENCH
- DELINEATED WITH TOPOGRAPHIC SURVEY

THICKNESS OF SOIL COVER OVER THE CLAY CAP

- < 2 FT (OR UNMAPPED)
- >= 2 FT

NOTES

1. APPROXIMATE LIMITS OF REFUSE HAVE BEEN ESTIMATED BASED ON INFORMATION PRESENTED IN THE PREDESIGN REPORT, APRIL 1997.

SCALE
AS SHOWN



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BLACKWELL LANDFILL NPL SITE
DU PAGE COUNTY, ILLINOIS

AREAS OF SUITABLE
VEGETATIVE SOIL COVER

APPENDIX
4



A

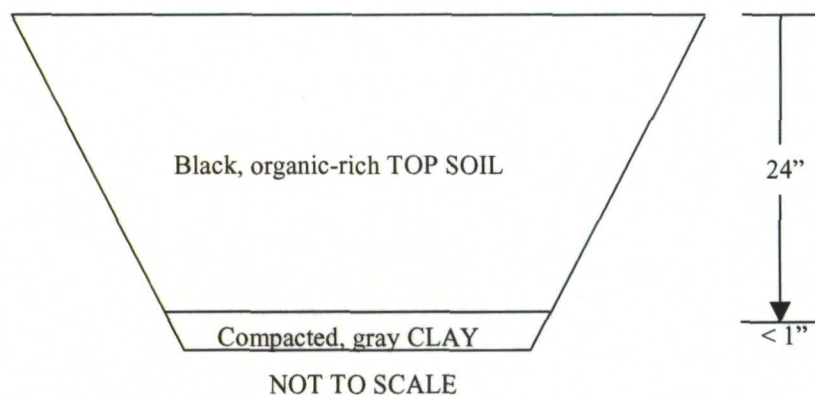


APPENDIX A

TEST TRENCH PHOTOS AND SOIL-LOGS

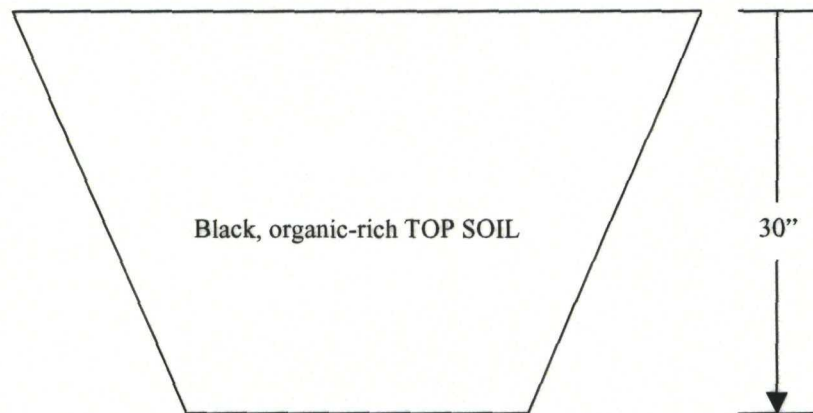


Trench 1





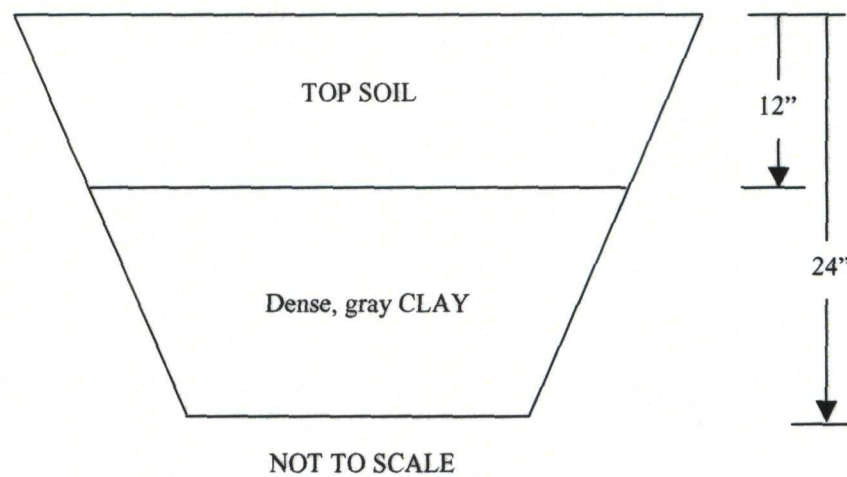
Trench 2



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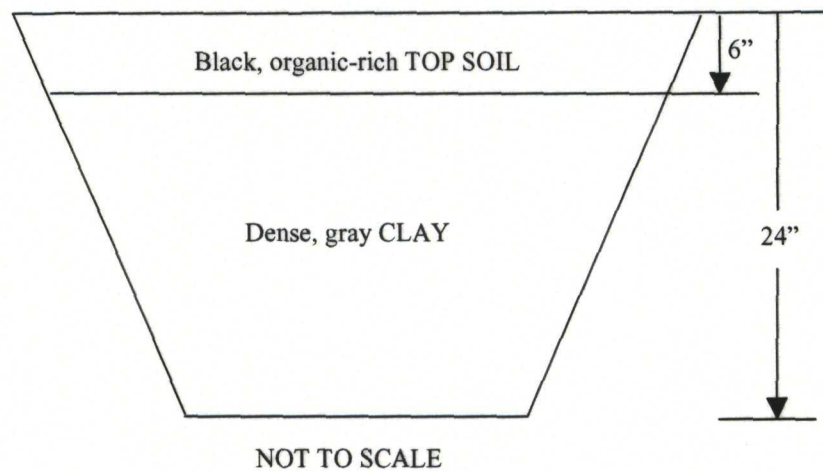


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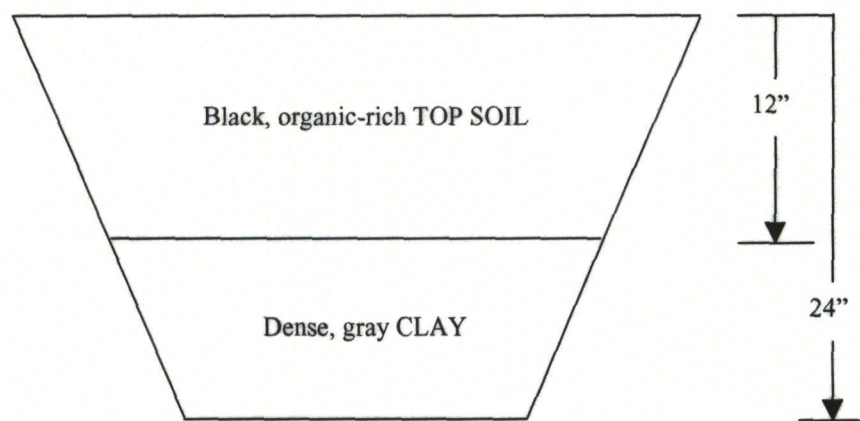


Trench 4





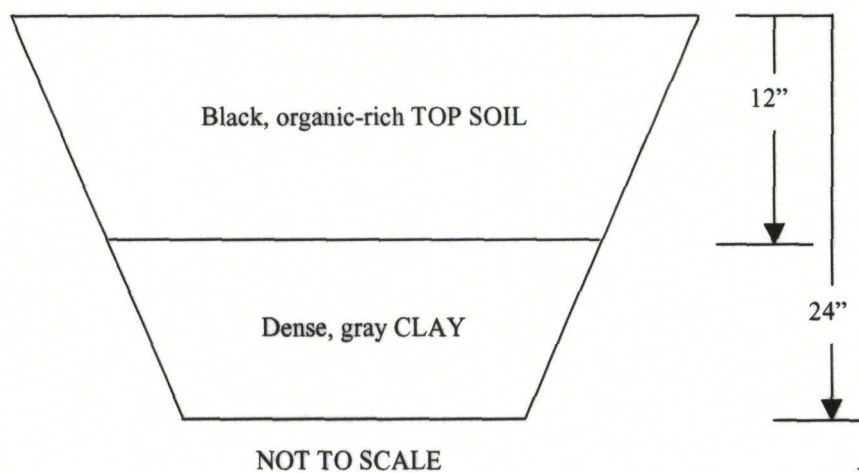
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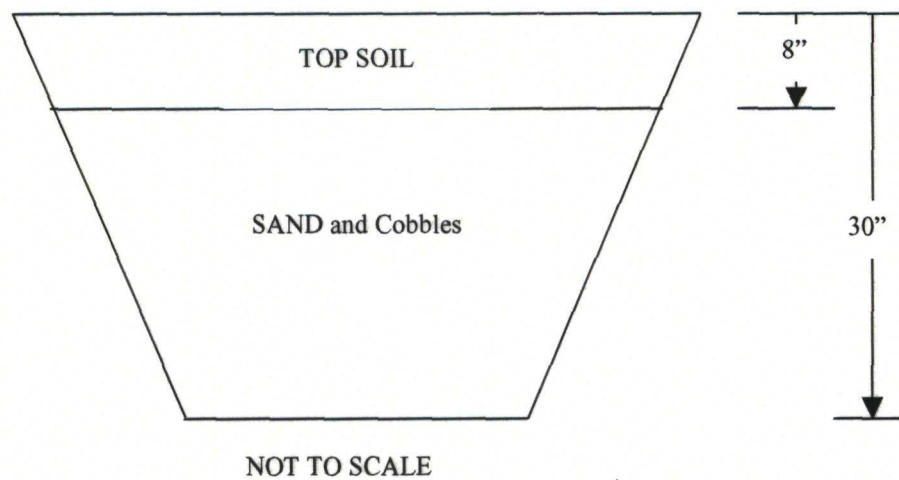


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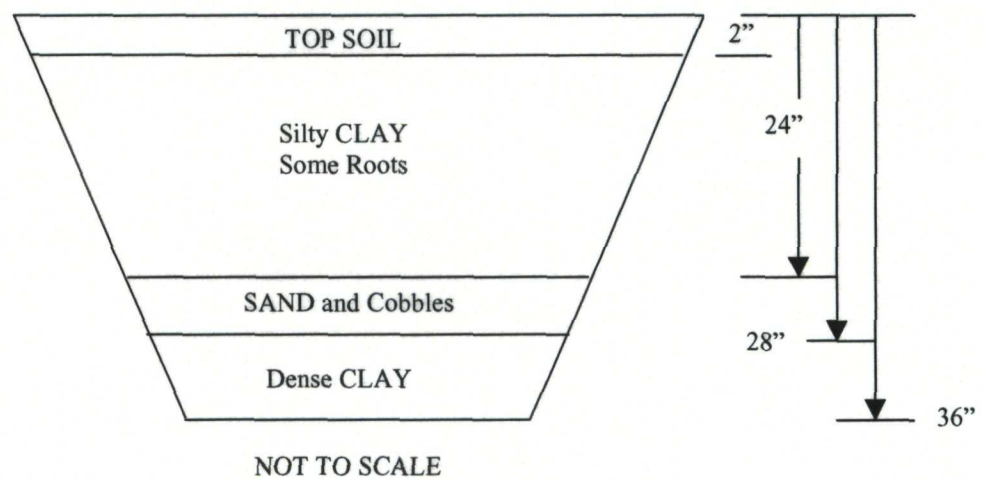


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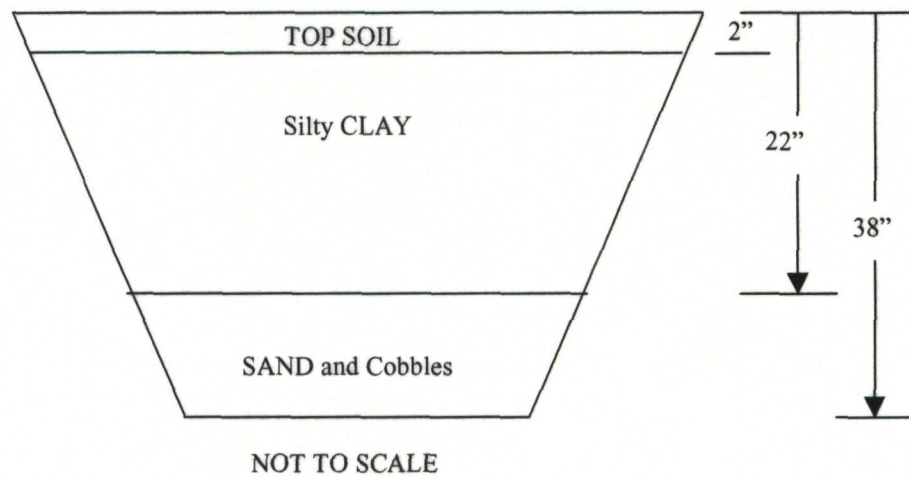


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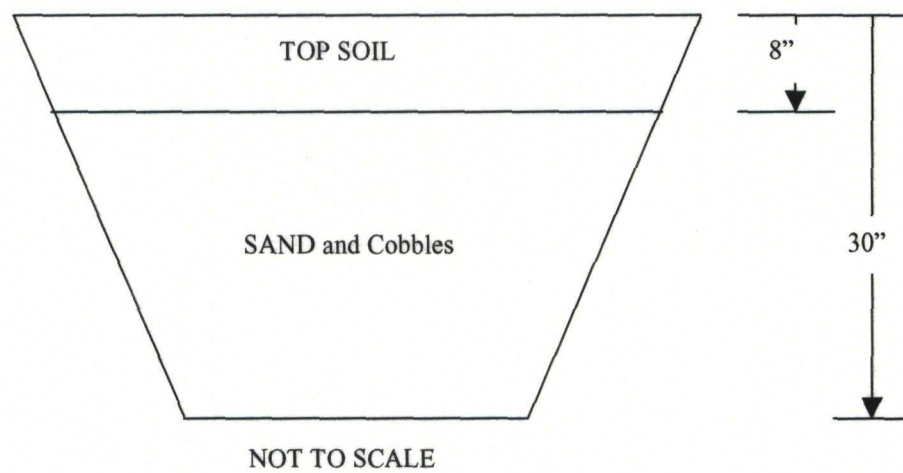


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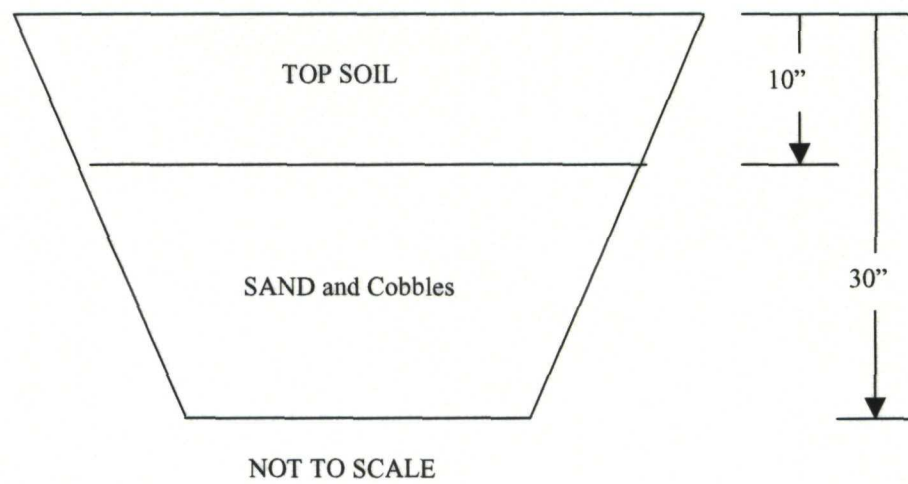


Trench 10



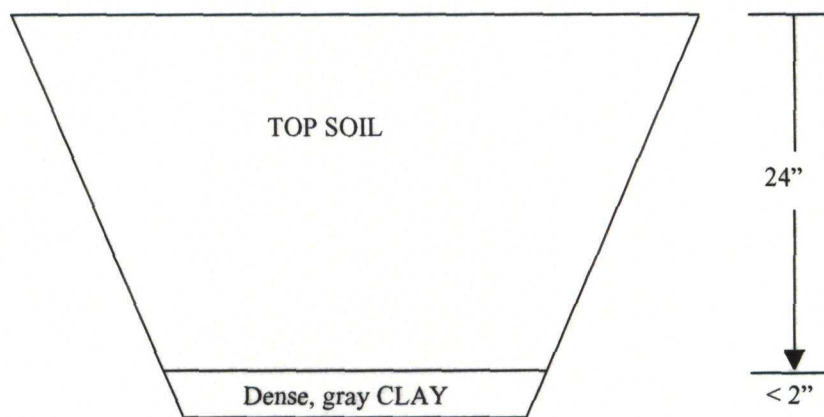


Trench 11

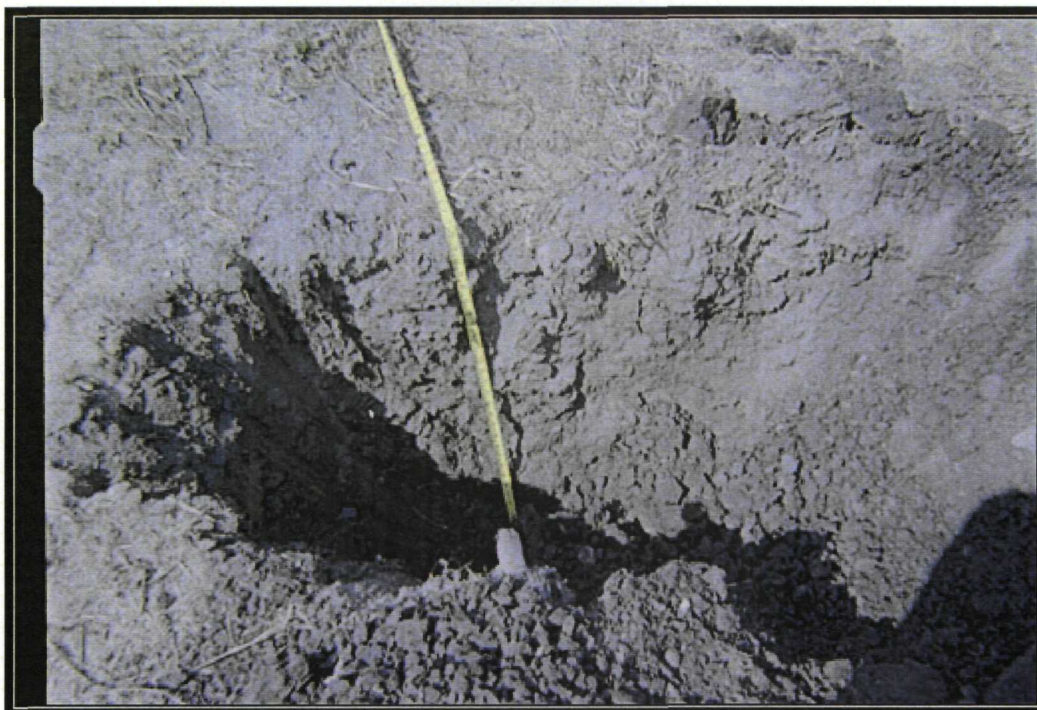




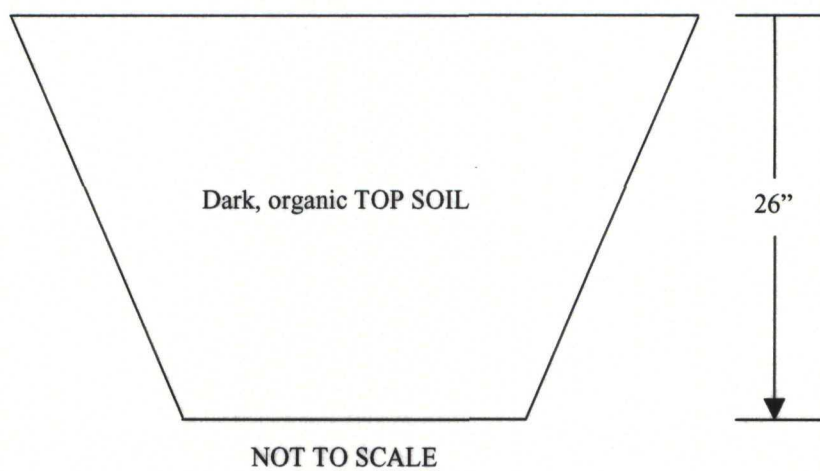
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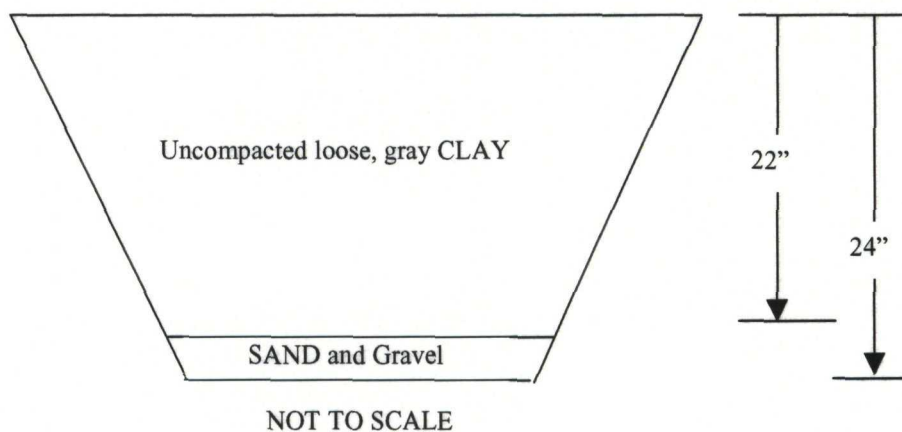


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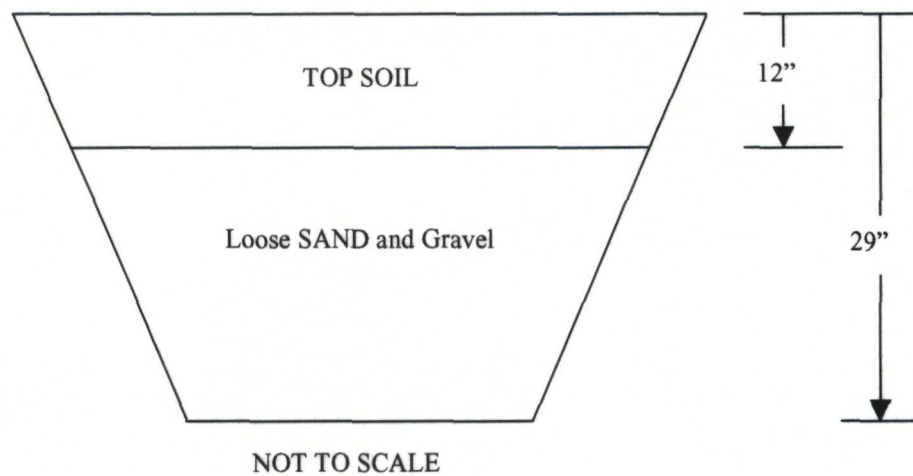


Trench 14



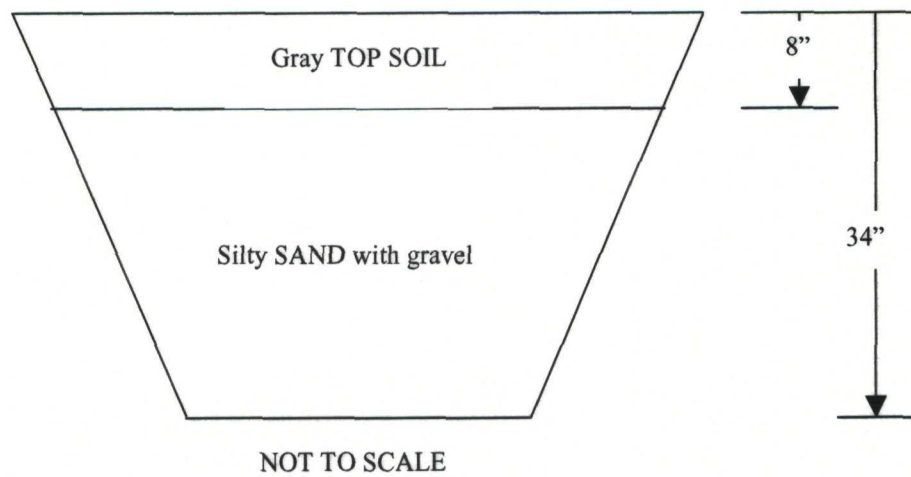


Trench 15



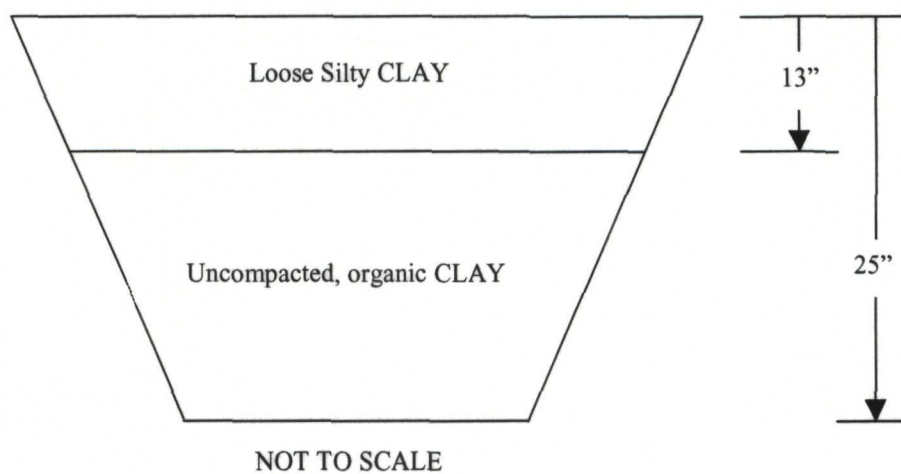


Trench 16



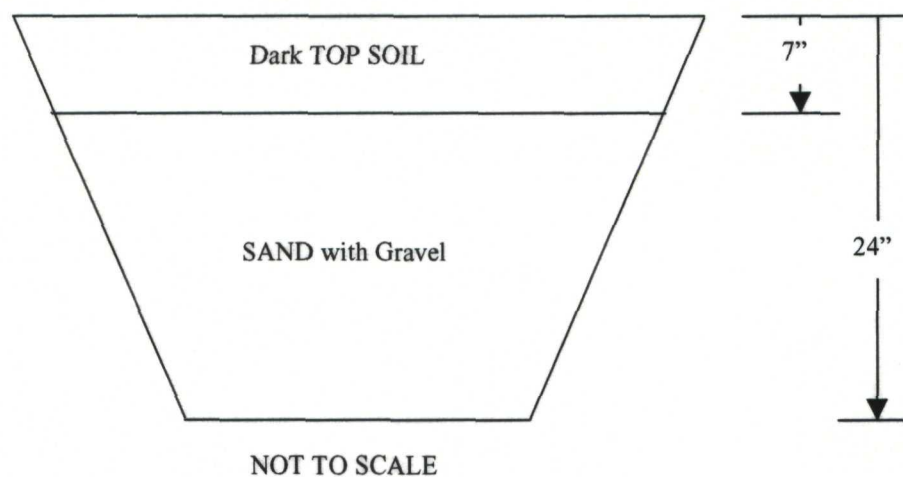


Trench 17



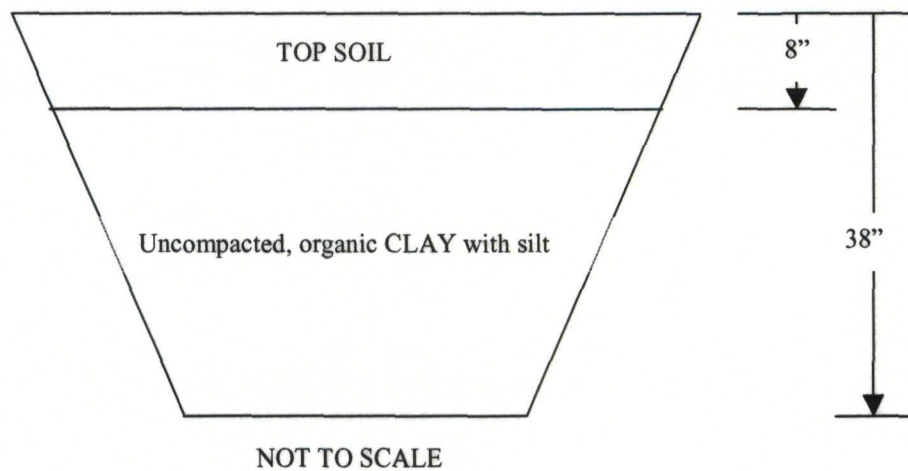


Trench 18



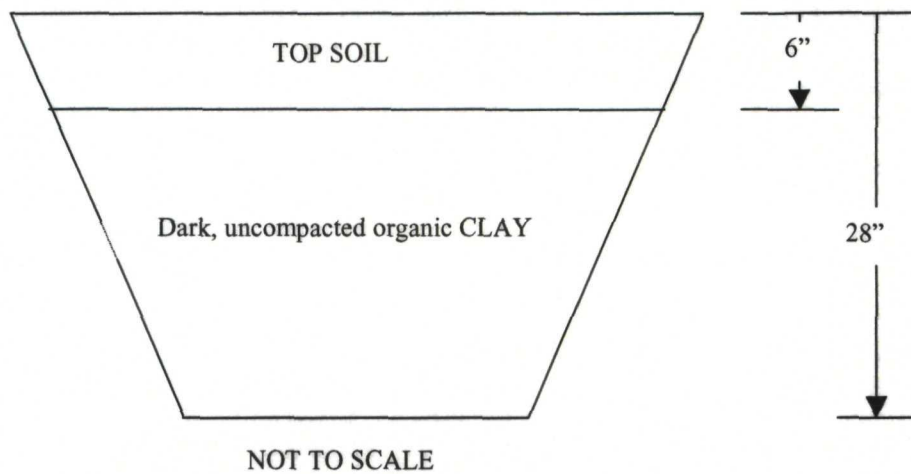


Trench 19



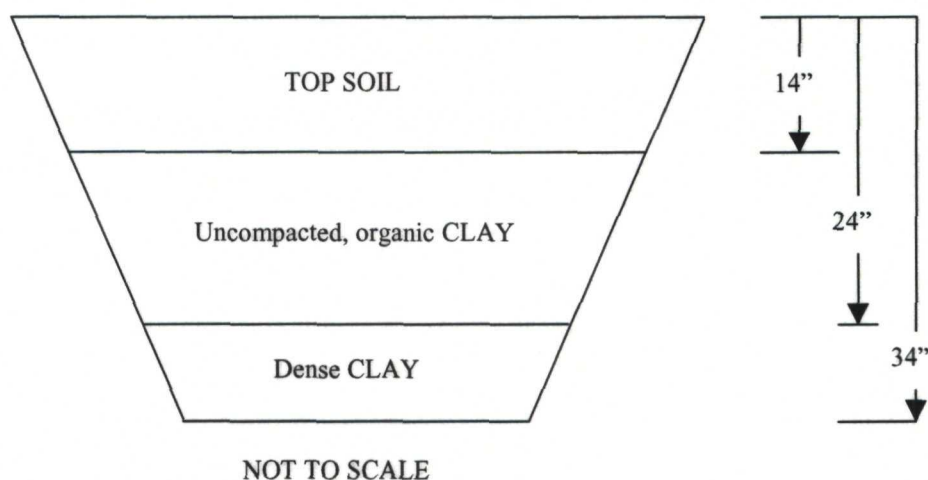


Trench 20



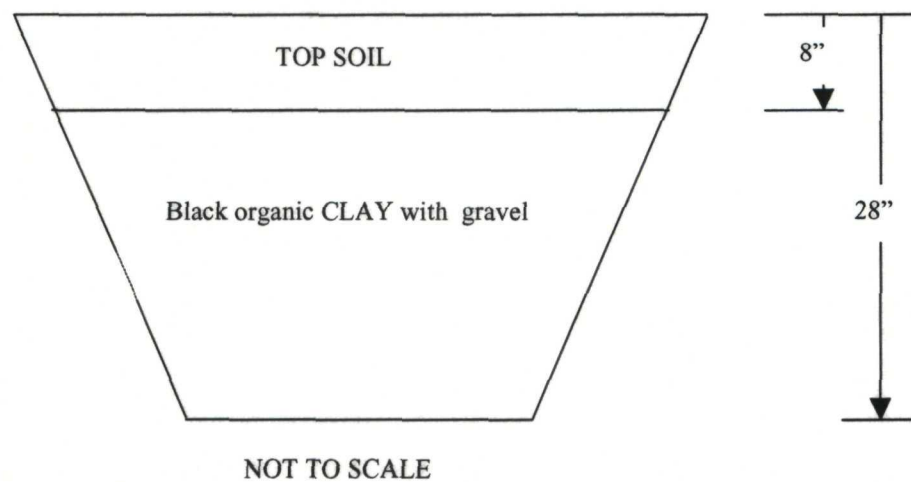


Trench 21



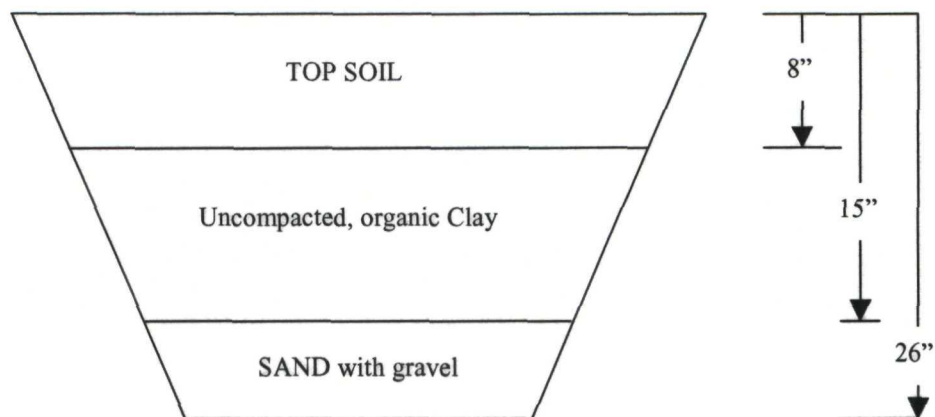


Trench 22





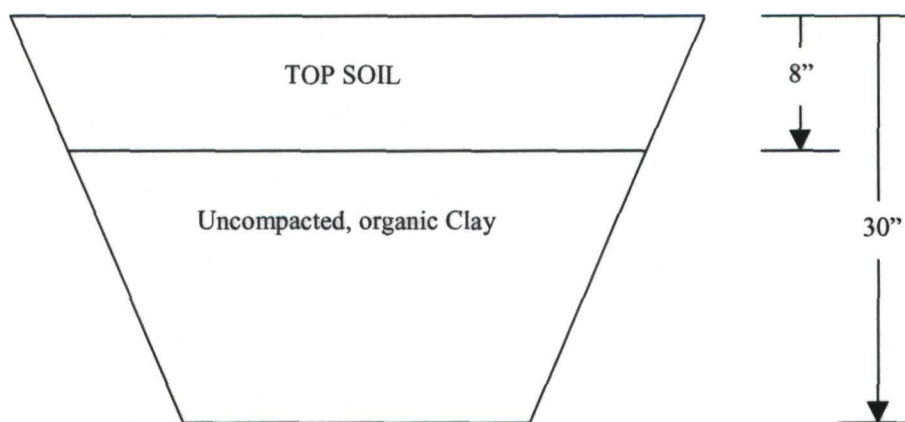
Trench 23



NOT TO SCALE



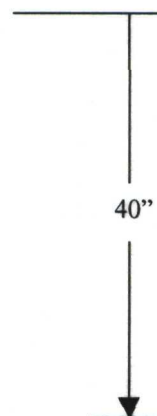
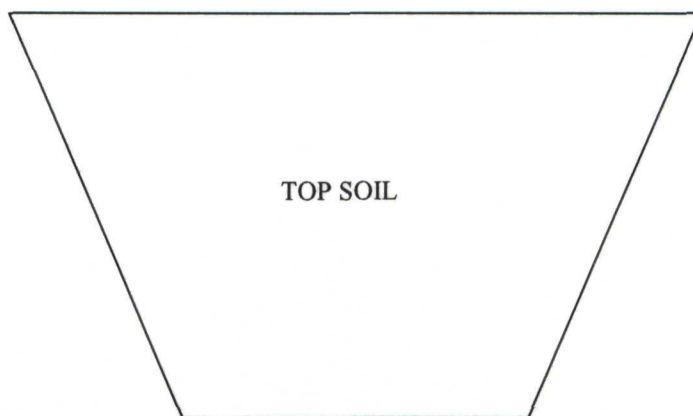
Survey Locations 3, 5



NOT TO SCALE



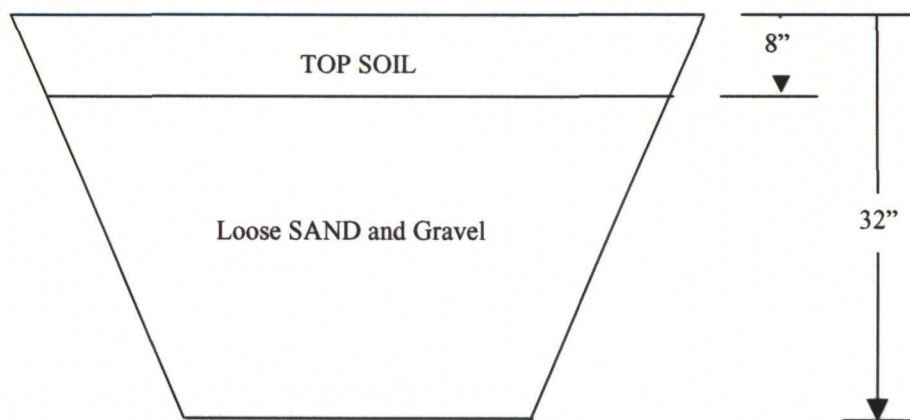
Survey Locations 1001, 1003, 1005



NOT TO SCALE



Survey Locations 47, 49, 50



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